

What is claimed is:

1. A radiological image pickup apparatus comprising:

a radiation detector including a common electrode formed on one side of a semiconductor layer sensitive to radiation and a plurality of split electrodes formed on the other side of the semiconductor layer, said radiation detector taking out charges occurring in the semiconductor layer with incidence of radiation as an electric signal from each of the split electrodes and detecting the spatial distribution of the incident radiation;

an electric signal processing circuit for performing signal processing of the taken-out electric signal in response to a gain setup value and also enabling an increase or a decrease in the gain setup value;

an image processing circuit for creating a radiological image based on the electric signal subjected to signal processing by said electric signal processing circuit;

a light application section for applying light to the split electrode formation side of the semiconductor layer; and

a light strength control section for controlling said light application section so as to increase or decrease the strength of applied light in response to a decrease or an increase in the gain setup value of said electric signal processing circuit.

2. The radiological image pickup apparatus as claimed in claim 1, wherein said radiation detector includes an intermediate layer having carrier selectivity, the intermediate layer being formed between the semiconductor layer and the split electrodes, and wherein the light is applied to the intermediate layer by said light application section at least during detection of radiation.

3. The radiological image pickup apparatus as claimed in claim 1, wherein the split electrodes are transparent or semitransparent at the wavelength of the light applied by said light application section.

4. The radiological image pickup apparatus as claimed in claim 2, wherein the split electrodes are transparent or semitransparent at the wavelength of the light applied by said light application section.

5. A radiological image pickup apparatus comprising:
a radiation detector including a radiation-light conversion layer for converting radiation into light and a plurality of semiconductor optical sensors formed on one side of the radiation-light conversion layer, the semiconductor optical sensors being provided by electrically splitting a semiconductor layer sensitive to light, said radiation detector

taking out light occurring in the radiation-light conversion layer with incidence of radiation as an electric signal from each of the semiconductor optical sensors and detecting the spatial distribution of the incident radiation;

5 an electric signal processing circuit for performing signal processing of the taken-out electric signal in response to a gain setup value and also enabling an increase or a decrease in the gain setup value;

 an image processing circuit for creating a radiological
10 imagebasedontheelectric signal subjected to signal processing by said electric signal processing circuit;

 a light application section for applying light to the semiconductor optical sensor formation side of the radiation-light conversion layer so that the light is not
15 directly detected by the semiconductor optical sensors; and

 a light strength control section for controlling said light application section so as to increase or decrease the strength of applied light in response to a decrease or an increase in the gain setup value of said electric signal processing
20 circuit.

6. The radiological image pickup apparatus as claimed in claim 5, wherein each of the semiconductor optical sensors includes an electric signal output electrode for exerting a
25 light shield function on a side on which the light from said

light application section is incident.

7. The radiological image pickup apparatus as claimed in claim 1, wherein said radiation detector includes a transparent glass substrate formed with pairs of thin-film transistor switches and capacitors, each pair for each split electrode, provided in a one-to-one correspondence with pixels of the radiological image, the transparent glass substrate being on the split electrode formation side of the semiconductor layer sensitive to radiation, wherein charges of the amount responsive to the radiation incidence strength are accumulated in the capacitors via the split electrodes with incidence of radiation and the thin-film transistor switches are switched on and off in order according to an external scan signal for reading the charges accumulated in the capacitors, whereby an electric signal is taken out.

8. The radiological image pickup apparatus as claimed in claim 2, wherein said radiation detector includes a transparent glass substrate formed with pairs of thin-film transistor switches and capacitors, each pair for each split electrode, provided in a one-to-one correspondence with pixels of the radiological image, the transparent glass substrate being on the split electrode formation side of the semiconductor layer sensitive to radiation, wherein charges of the amount responsive

to the radiation incidence strength are accumulated in the capacitors via the split electrodes with incidence of radiation and the thin-film transistor switches are switched on and off in order according to an external scan signal for reading the charges accumulated in the capacitors, whereby an electric signal is taken out.

9. The radiological image pickup apparatus as claimed in claim 5, wherein said radiation detector includes a transparent glass substrate formed with pairs of thin-film transistor switches and capacitors, each pair for each semiconductor optical sensor, provided in a one-to-one correspondence with pixels of the radiological image, the transparent glass substrate being on the semiconductor optical sensor formation side of the radiation-light conversion layer, wherein charges of the amount responsive to the radiation incidence strength are accumulated in the capacitors via the semiconductor optical sensors with incidence of radiation and the thin-film transistor switches are switched on and off in order according to an external scan signal for reading the charges accumulated in the capacitors, whereby an electric signal is taken out.

10. The radiological image pickup apparatus as claimed in claim 1, wherein said image processing circuit includes a

correction coefficient registration section for registering
an offset correction coefficient for correcting location
variations in offset between electric signals and a sensitivity
correction coefficient for correcting location variations in
5 sensitivity between electric signals for each electric signal
to create the radiological image, wherein the strength of the
light applied by said light application section is previously
classified into several steps and the offset correction
coefficient and the sensitivity correction coefficient are
10 calculated for each assumed step of the assumed light strength
and are registered in the correction coefficient registration
section, and wherein said image processing circuit performs
offset and sensitivity variation correction processing to each
electric signal based on the offset correction coefficient and
15 the sensitivity correction coefficient already registered for
the assumed step of the assumed light strength corresponding
to the step of the strength of the actually applied light.

11. The radiological image pickup apparatus as claimed
20 in claim 2, wherein said image processing circuit includes a
correction coefficient registration section for registering
an offset correction coefficient for correcting location
variations in offset between electric signals and a sensitivity
correction coefficient for correcting location variations in
25 sensitivity between electric signals for each electric signal

to create the radiological image, wherein the strength of the light applied by said light application section is previously classified into several steps and the offset correction coefficient and the sensitivity correction coefficient are calculated for each assumed step of the assumed light strength and are registered in the correction coefficient registration section, and wherein said image processing circuit performs offset and sensitivity variation correction processing to each electric signal based on the offset correction coefficient and the sensitivity correction coefficient already registered for the assumed step of the assumed light strength corresponding to the step of the strength of the actually applied light.

12. The radiological image pickup apparatus as claimed in claim 5, wherein said image processing circuit includes a correction coefficient registration section for registering an offset correction coefficient for correcting location variations in offset between electric signals and a sensitivity correction coefficient for correcting location variations in sensitivity between electric signals for each electric signal to create the radiological image, wherein the strength of the light applied by said light application section is previously classified into several steps and the offset correction coefficient and the sensitivity correction coefficient are calculated for each assumed step of the assumed light strength

and are registered in the correction coefficient registration section, and wherein said image processing circuit performs offset and sensitivity variation correction processing to each electric signal based on the offset correction coefficient and
5 the sensitivity correction coefficient already registered for the assumed step of the assumed light strength corresponding to the step of the strength of the actually applied light.